



United States
Department of
Agriculture

Forest
Service

NA - St. Paul

Reply to: 3400

Date: February 2, 1987

Subject: Gall Rust Evaluation Report #4

To: Cooperators

Enclosed are the final results of the 1985 fungicide application of Bayleton® 50WP in General Andrews State Nursery in Willow River, MN and Hayward State Nursery in Hayward, WI. The 16 oz. rate proved to be effective at the Minnesota Nursery, reducing gall rust infection by 17% in treated plots. Opportunities to test other gall rust control techniques exist, and will be initiated at the General Andrews Nursery this spring.

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Enclosures

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GALL RUST CONTROL EVALUATION REPORT 4

Abstract

The 16 oz foliar application rate of Bayleton® 50WP significantly reduced gall rust infection on jack pine seedlings at General Andrews State Nursery in Minnesota. The nursery plans to apply Bayleton as a soil drench in 1987, in efforts to control gall formation further.

Introduction

An evaluation of foliar applications of Bayleton® 50WP (triadimefon)¹ for control of jack pine gall rust (Cronartium quercuum f. sp. banksianae) began in the spring of 1983 at the General Andrews State Nursery, Willow River, MN and the Hayward State Nursery, Hayward, WI. The Willow River nursery had reported losses up to seventy percent in some beds due to main stem gall formation on 2-0 stock. The Hayward nursery had experienced some mortality, but losses were not as severe.

Aeciospore germination tube elongation tests conducted at the Minnesota nursery (Croghan, 1983) determined that most of the gall rust infection there is caused by pine-oak rust (Cronartium quercuum). It is assumed that the same tests would have shown similar results at the Wisconsin nursery. Bayleton should therefore effectively control this disease since this fungicide successfully controls fusiform gall rust (Rowan 1982), caused by a closely related fungus species (Cronartium quercuum f. sp. fusiforme).

Foliar applications of 4 oz Bayleton/A/100 gal water were conducted in 1983 and 1984 at both nurseries, on 1-0 and 2-0 jack pine, respectively. Bayleton treated 2-0 jack pine seedlings were then evaluated for gall rust infection in the fall of 1984. Results of that evaluation combined with greenhouse inoculations of jack pine seedlings completed by the University of Minnesota determined that the 4 oz application rate did not effectively control the disease (Croghan, January 1985; Croghan, December 1985). Therefore, a 16 oz rate was proposed, with subsequent fungicide applications completed in 1985 and 1986. Because it takes a year or more for galls to develop following infection, this report summarizes the efficacy of only the 1985 spray application, evaluated in September 1986.

Methods

Personnel at both nurseries made five Bayleton applications (16 oz/A/100 gal water) beginning in May and continuing at approximate two week intervals in 1985 (Figures 1 and 2). Portions of the beds were left unsprayed at both nurseries to draw comparisons with treated areas. General Andrews State Nursery personnel repeated the Bayleton applications on 2-0 jack pine stock in 1986. The success of the 1986 spray program will be observed in an outplanting study scheduled in 1987.

To evaluate the rate of gall rust infection, randomly located subplots consisting of groups of 20 seedlings were selected in both treated and control

beds. Individual seedlings were examined for gall formation, and were then rated as galled or non-galled. In the General Andrews State Nursery, 10 subplots were located per bed x 24 beds (12 sprayed, 12 non-sprayed) = 4,800 seedlings examined. In the Hayward State Nursery, only three subplots were evaluated per bed x 18 beds (nine sprayed, nine non-sprayed) = 1,080 seedlings examined. This smaller sample was taken due to the seemingly low incidence of gall rust infection at the Hayward Nursery at the time of evaluation.

Results and Discussion

Results show that the 16 oz foliar application rate significantly reduced jack pine gall rust at the General Andrews State Nursery (Table 1). At the Hayward State Nursery, mean variances were too large (presumably due to small sample size) to generate statistical differences between treated and control plots. It was interesting to note, however, that more than half of their control plots showed a higher rate of infection than Bayleton-treated plots.

Although the 16 oz foliar application rate of Bayleton 50WP is successful in reducing gall rust formation on jack pine seedlings in Minnesota, the 20% infection rate will still lead to substantial losses after outplanting, based on transplant survival trials conducted at the nursery in 1984 (see report 2, January 29, 1985). Main stem gall infections were consistently observed at or just above groundline, suggesting that the seedlings were not adequately protected shortly after germination, or perhaps throughout the sequence of applications. Therefore, plans are underway to apply Bayleton as a soil drench in the spring of 1987 at General Andrews State Nursery. Apparently, the fungicide is absorbed systemically via plant roots better than via foliage (personal communication, Ken Noegal, Mobay Fungicide Product Manager) which may help to minimize main stem gall infection near the groundline. Seed treatment is also an option prior to fall planting in 1987.

¹The use of trade names does not constitute endorsement of the product to the exclusion of others which may be suitable.

Literature Cited

Croghan, C. December 1983. Gall rust control evaluation report number 1 (unpublished data). 5 pp.

Croghan, C. January 1985. Gall rust control evaluation report number 2 (unpublished data). 4pp.

Croghan, C. December 1985. Gall rust control evaluation report number 3 (unpublished data). 4pp.

Rowan, S. 1982. Influence of method and rate of application of Bayleton on fusiform rust on slash pine. Tree Planters Notes 33(1):15-17.

Aknowledgements

We would like to thank General Andrews and Hayward State Nursery personnel for their cooperation. Thanks also to Mobay Chemical Corporation for supplying the fungicide.

Table 1. Mean gall rust infection o 2-0 jack pine seedlings in Bayleton treated and control plots at General Andrews and Hayward State Nuseries, September, 1986.

<u>Location</u>	<u>Treatment</u>	<u>Infection (%)</u>	<u>Std. Error</u>
General Andrews Nursery	Bayleton	20%*	.023
	Control	37%*	.021
Hayward Nursey	Bayleton	2%	.005
	Control	5%	.016

*Sample means significantly different using a Student's T-distribution ($P=.01$).



SPRAYED



West end of 50' plot marked with two yellow flags, east end marked with one red flag.

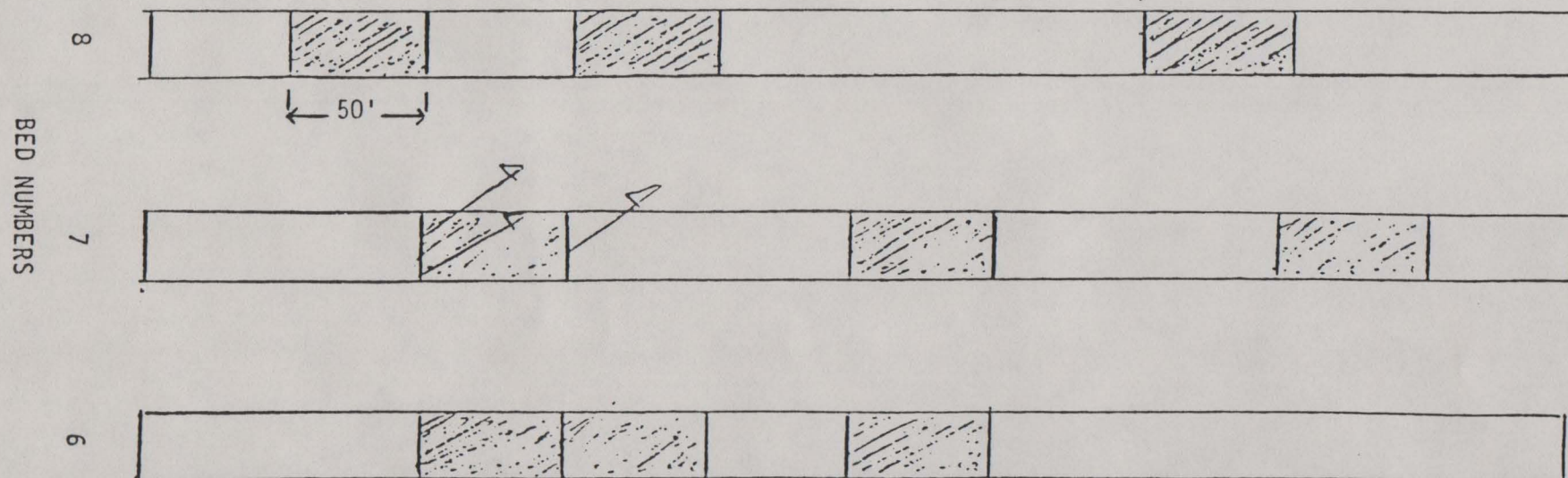


FIGURE 2

Plot layout for Bayleton 50 WP application (16 oz/100 gal/acre) to 1-0 jack pine for evaluation of gall rust control, May 1985, block A-6, beds 6, 7, and 8, Hayward State Nursery.

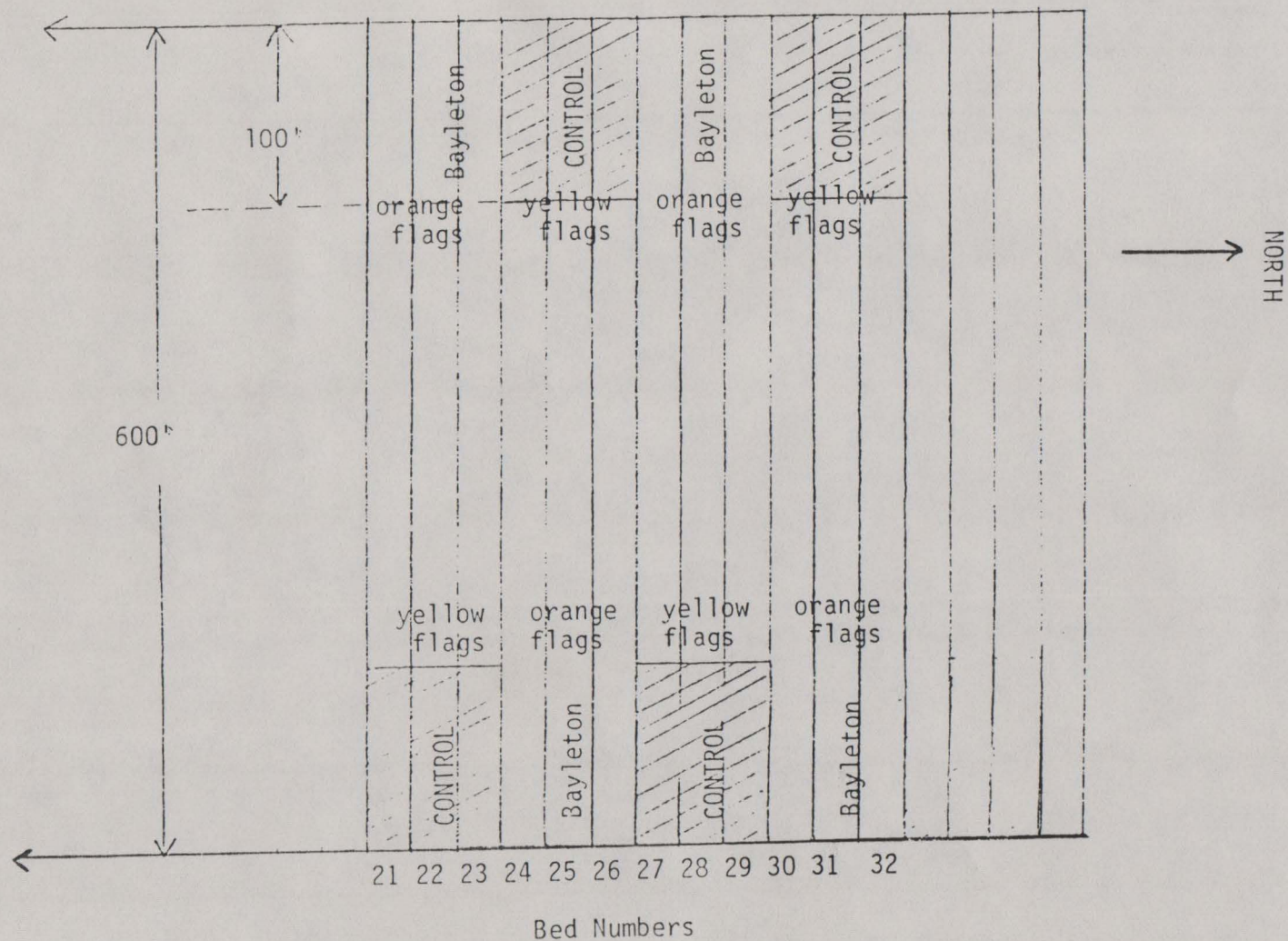


FIGURE 1

Plot layout for Bayleton 50 WP application (16 oz/100 gal/acre) to 1-0 jack pine for evaluation of gall rust control, May 1985, compartment G-1, Beds 21-32, General Andrews Nursery.